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SARCOMA OF THE VAGINA.

A STATISTICAL STUDY OF 102 CASES, WITH THE REPORT OF A NEW CASE OF THE GRAPE-LIKE SARCOMA OF THE VAGINA IN AN INFANT.

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Sarcoma of the vagina is so rare an affection that the literature contains a total of 101 cases to which I add a new one, making 102 cases upon record. Its rarity and its fatality combine to make it an interesting affection, and when an attempt is made to review the literature of the subject so many features of interest present themselves that the matter becomes quite absorbing.

Sarcoma of the female organs of generation may be divided clinically into those arising from the vulva, from the vagina, from the vesicovaginal septum, from the rectovaginal septum, from the cervix uteri, from the corpus uteri, and from the ovary. In selecting the cases embraced in the statistics given in this paper the attempt has been made to include only those arising from the vagina itself, though in a few the tumors occurred so low down as to be vulvovaginal, and of others the reporters stated that the tumors arose from the vesicovaginal or rectovaginal septa, though their descriptions showed that the tumors corresponded perfectly with vaginal tumors.

The literature begins quite early, in fact, before the separation of the sarcoma and other tumors was made by the microscope, and it is only the opinion of the reviewer, and not absolute knowledge of the tumor tissue that enables him to decide what shall be or shall not be regarded as sarcomas. In working over the case reports a confusion arose through the different methods employed by earlier writers in referring the cases to individuals. Thus, when the literature was reviewed by a clinician he was prone to refer all his collected cases to the clinicians in whose experience they arose; if, on the other hand, the cases were collected by a pathologist, no attention was paid to this point. The result has been that in a number of the former tabulations and analyses certain cases have been counted more than once. To overcome this difficulty, the method adopted in the present writing has been to credit each case to the author first publishing it regardless of his actual relation to the patient, and to verify every case by referring to the original writing.

Unfortunately the case reports are so commonly imperfect that none of the tabulations can be complete. Thus, the table showing the age incidence contains a confusion of the ages at which the tumor was first observed and the ages at which the patient died. Usually the duration of the case is so brief that not much error results in consequence, but in the case of children it may be important, as in one case in which the tumor is known to have been present at birth, though the child did not die of it until the sixth year.

It is extremely unfortunate that the desire to report a rare case so often leads to its publication before knowledge of it is perfected. The case appears at the clinic, is recoginzed as a rare affection, an ingenious operation is performed, and the patient recovers from it. The clinician then hastens to report the case and tell what has been done without waiting to learn what the final outcome was to be. The evils of this practice are well shown by the tabulation showing the "Fatality of the Different Histological Forms of Sarcoma Vaginæ Exclusive of Sarcoma Botryoides Vaginæ," where out of a total of 58 cases, the termination of the affection is unknown in 34. It is likewise unfortunate that histological examinations have not been made in all cases. The same table shows that no histological data are available in 14 of the cases.

Sarcoma of the vagina occurs at all ages. In our collection of 102 cases there is 1 case in which the tumor was congenital, and 1 that came to operation when eighty-two years of age. It is, however, most frequent in the first, fourth, and sixth decades of life. The occurrence of a special form of infantile sarcoma—sarcoma botryoides, the "grape-like sarcoma"—of which 32 cases are on record, makes it overwhelmingly more frequent in infancy than at any other time of life. Though to all appearances a clinical form of the disease, the sarcoma botryoides vaginæ is so well characterized that throughout most of the following tabulations the tumors have been separated into "miscellaneous" and "botryoides."

The first case of sarcoma botryoides seems to have been recorded by Guersant in 1854; it is, however, difficult to decide what may have been the nature of many other tumors recorded earlier or about the same time as "malignant polypi" of the vagina. A number of such cases were carefully reviewed but rejected and the policy was adopted of following the example of the earlier compilers who all accept Guersant's case as the first to be reported.

The first careful pathological studies, with special reference to the histology of the tumor came from Kaschewarowa-Rudwena, who curiously enough was able to report two cases from her own clinic, and also observed one in a bitch. Though this tumor differs from the other forms of sarcoma in its clinical manifestations, being characterized by a peculiar papillary or polypoid form with numbers of cysts—the grape-like sarcoma of Pfannenstiel, being observed only in infancy and being highly malignant, it is not so well characterized in all cases as to leave no room for doubt as to its proper classification, and is so varied in histology as not to find a separate place for itself. This is well shown by reference to the table showing the "Histological Forms of Sarcoma Botryoides."

Leaving this peculiar form in a group by itself, we find the remaining sarcomas to form a miscellaneous group embracing nearly all of the histological varieties of sarcoma. The peculiar appearance—grape-like appearance—of sarcoma botryoides has led to much speculation upon its origin. The early age at which the tumor makes its appearance suggests that the tumor is congenital but there is only one case, that of Granicher in which it is certainly known that the tumor was present at birth. Naturally a tumor in such a situation as the vagina might escape observation until it had become of sufficient size to exert pressure symptoms, or as is more usual, until it protrudes from the vulva.

Ahlfeld believed that the peculiar papillary and polypoid character of sarcoma botryoides was sufficient evidence that the tumor arose from the papillæ so numerous in the vaginal wall during the fifth month of intra-uterine life, and believed that all of the tumors were congenital. In this view he was followed by Aubert. Hauser and Kolisko, on the other hand, believe that the tumors are best explained by Cohnheim's theory of "embryonal vestiges," and Kolisko gives the following facts in support of his view: (1) The distribution of the tumor does not correspond with that of the papillæ. (2) The tumors commonly arise from a broad base and as single growths. (3) The tumors of the bladder resulting from extension of the growth are commonly polypoid, though there are never villi in the normal bladder. (4) The recurrent tumors preserve the polypoid character. The occurrence of a warty vaginal mucosa such as is described by Soltmann and was found in one of Kolisko's own cases can be attributed to the greater ease with which the tumor spreads in the mucosa as contrasted with the subjacent muscular tissue. (5) The structure with its miscellany of round and spindle cells, giant cells, muscle cells, epithelial cells, and cartilage, is in favor of Cohnheim's theory. Still another view of the etiology of the tumor has been suggested by Pfannenstiel, that is, that it arises from the endothelium of the blood and lymph capillaries.

The clinical course of the sarcoma botryoides is much the same in all cases. The tumor first calls attention to itself either by projecting through the vulvar orifice or through the occurrence of a bloody discharge from the vagina. In most cases the diagnosis of "vaginal polyp" is made and the growth excised or divulsed. In most cases the tumor quickly recurs, after which there may be a succession of operations or a radical operation. In one case in which the operation was so radical that the entire vagina, uterus, tubes, and ovaries were removed the little patient is said to have recovered. In all other cases the tumor recurred, became inoperable, distended the vagina so as to fill the pelvis, invaded the bladder and caused the death of the patient either through exhaustion or from uremic blood poisoning. In no case has the tumor given metastasis. It is a purely local progressively extending tumor.

When the reports of other infantile sarcomas are read we find that they parallel the clinical course of sarcoma botryoides except that they lack the grape-like appearances, are not polypoid and not cystic.

The clinical course of the adult sarcomas is in general much the same. Though coming more early to operation, they, with the exception of the more benign forms, tend to rapid recurrence, to infiltrate the bladder and to cause a fatal termination through interference with the urinary passages. In these cases metastasis is very rare; the disease is local.

The geographical distribution of the tumor though shown in one of the tables is of small interest. The tumor attracted most attention in Germany, has been made the subject of numerous communications, and it is safe to surmise that few cases have escaped publication in that country. This gives Germany an apparent preponderance of cases.

The chronological distribution though more accurate is subject to the error that arises from evanescent interest in the subject. My tabulation is based chiefly upon the date of publication, but is inaccurate, because when interest upon the subject was aroused, cases from years before were sometimes hurried into print. The table shows, however, that the sarcoma botryoides averages one case each year and eight months; the miscellaneous vaginal sarcomas, one case each year and six months.

Certain writings on the subject, of special merit both from the scientific and synoptical points of view, should receive mention. The best of these are:

Veit. Handbuch der Gynäkologie. 1897, i, 354.
Powers. St. Bartholomew's Hospital Reports, xxxi, 1895.
Kolisko. Wiener klin. Wochenschrift, 1889, pp. 109, 130, 159.
Williams. Twentieth Century Practice of Medicine, 1898, xvii, 530.
Jellett and Earl. Trans. Royal Acad. of Med. of Ireland, xxii, 1904.

A word should be said with reference to the sarcomas that arise from the vesicovaginal and rectovaginal septæ. Being more deeply situated than the vaginal mucosa from which the true vaginal sarcomas arise, their tendency is to invade the deeper tissues, fill up the pelvis and give metastases to the pelvic and abdominal lymphatics and not to confine themselves to the vagina and bladder.

Sarcoma Botryoides Vaginæ—New Case. F. E. was born March 22, 1908, of parents in whose family history and in whose personal histories there seemed to be nothing of interest so far as the present circumstances are concerned. They were already possessed of one healthy child, and since the death of the one whose case we are about to consider, have became the parents of another.

On July 6, 1908, Dr. Robert L. Pitfield, of Germantown, was called to see the child, then aged three and one-half months, and shown a small tumor first observed by the nurse two days before. Two days later, at his request, we saw the little patient together and carefully examined the tumor, which proved to be peculiar and interesting.

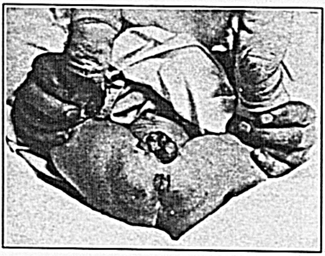

FIG. 1.—Photograph showing the tumor projecting from the vulva when the patient cried and made expulsive efforts. This photograph was made shortly before the patient's death by Dr. George E. Pfahler.

When the thighs of the baby were separated, the vulvar orifice gaped slightly and permitted a laterally compressed reddish body of small size and moist appearance to be seen (Fig. 1). When the labia were more widely separated for a better view of the formation, the child began to cry and make expulsive efforts which resulted in the descent through the vulvar orifice of an irregularly hemispherical tumor about 3 cm. in its greatest diameter that sprang from the posterior and left lateral walls of the vagina. It was red in color and at first sight appeared smooth. This appearance was later found to depend upon the presence of considerable mucopus with which the surface was bathed, for when it was wiped off so that a more careful examination could be made, the growth was found to be composed of a polypoid mass, the intervals between the polypi being filled with the secretion and so disguised. Upon the surface of the tumor a number of small, clear, amber-colored cysts were conspicuous when the secretion was wiped off. The largest of the cysts was about 0.5 cm. in diameter. They gave the growth much the appearance of a bunch of currants infiltrated with reddish-gray slime.

When the child ceased to cry the tumor again retracted into the vagina. Dr. Pitfield had already made the diagnosis of "grape-like sarcoma," which I confirmed, though we were uncertain whether the growth originated in the vagina where we saw it or whether it sprang from the cervix uteri.

A very unfavorable prognosis was at once rendered, with the recommendation that an operation be immediately arranged for.

Some days later the child was taken ill with enterocolitis, and as at that time it was very warm and sultry in Philadelphia, it was taken to Ocean City, N. J. Here the patient was treated by Dr. Howard Reed, and speedily convalesced from the summer complaint. Upon July 24, Dr. Reed was able to operate and removed as much of the tumor as was attached to the vaginal wall. This mass, which was sent to me in formaldehyde solution, formed the foundation of my studies of the histological character of the tumor.

The child improved rapidly after the operation, but the wound did not heal and the tumor recurred so rapidly that on August 28 it was necessary to perform a second excision. In ten days the tumor had again recurred and grew so rapidly that it soon filled the entire vagina. The patient was now seen in consultation by Professor W. E. Ashton, who declared the condition to be inoperable. It was, therefore, thought that the *x*-rays might hold out a chance of benefit and the little patient was taken for the purpose to Dr. George E. Pfahler who began with three treatments weekly. The early results appeared encouraging. After six treatments the tumor had diminished to one-third of its original size, and after ten treatments to about one-fourth. An inguinal enlargement entirely disappeared. The baby was, however, much troubled with the summer diarrhœa and became very feeble. Partly because of the patient's general condition, and partly because he was to leave the city for a short time, Dr. Pfahler discontinued the treatments for a month. During that time, in spite of progressive emaciation and continued diarrhœa, the tumor grew again to its original size.

The condition of the little patient in the meantime became very distressing because of increasing difficulty of micturition and defecation. This difficulty increased to such an extent that the violent expulsive efforts of the patient had to be supplemented by compression of the lower part of the abdomen by the mother or nurse in order that a small quantity of urine or feces could be discharged.

These conditions persisted and increased. The child suffered almost continuously, slept scarcely at all, emaciated almost to a skeleton, and died December 8, 1908, aged eight and one-half months, the tumor having been known to exist for just five months.

Autopsy. December 9, 1908. The body is that of a much-emaciated female infant. Rigor mortis marked. Thorax, abdomen, and left arm livid. Occasional petechia upon the skin.

From the vaginal orifice there projects a pyriform, dark colored, necrotic mass measuring about 1.5 by 2 cm. This can be traced into the vagina to a broad attachment upon the left lateral and posterior walls. Upon the surface a few small opalescent cysts (?) can be seen.

The appearance of the tumor is now very different from that first noted in the living child. Its grayish-red color is now changed to a dark necrotic red-black; its polypoid character has disappeared and it forms a solid mass. The clear cysts, like currants, that formed a large part of the original growth are gone and in their place are a few cysts with semiopaque contents. In addition to the chief mass there are a few pinhead sized nodules on the right labium majus, and a nodule the size of a pea in the vestibule.

The body was opened by the usual incisions, the nervous system not being removed.

Thorax: Pericardium, normal. Pleuræ, normal. Heart, normal —moderator band in the left ventricle. Right lung, hypostatic congestion. Left lung, hypostatic congestion; scattered foci of atelectasis. Thoracic lymph nodes somewhat larger and redder than is usual in infancy but otherwise normal. No thoracic metastases.

Abdomen: Spleen, large, bluish-purple, mottled. Upon section congested but otherwise normal. A small supernumerary spleen in the gastrosplenic omentum. Adrenals, normal. Liver, normal. Bile ducts, normal. Gall-bladder, normal. Duodenum, normal. Stomach, dilated. Small intestine, enlargement of the lymph follicles. Large intestine, enlargement of the lymph follicles. Mesenteric lymph nodes, slightly enlarged and red like those of the thorax. No signs of abdominal metastases. Kidneys, hydronephrosis and dilated ureters on both sides. The kidney substance also showed a mild grade of parenchymatous degeneration.

Pelvis: The pelvic cavity is completely filled by a mass formed by adhesion of all of the viscera. The chief mass is found to be the tumor distending the vagina. This tumor is dark red, almost black in color and forms a mass measuring 4.5 cm. in length by 3 cm. in breadth. It springs by a broad attachment from the posterior and left lateral walls about 1.5 cm. from the cervicovaginal junction. The growth is lobulated and its surface generally warty but highly necrotic. The anterior vaginal wall is invaded in its central third by an aggregation of wart-like formations most of which are sessile, though some are pedunculated. The vaginal wall at the attachment of the tumor is considerably thickened, and appears to be infiltrated around the base of the neoplasm; the remainder is thin and attenuated. At no point has the tumor broken through the vaginal wall except at its base. The right anterior vaginal wall is attached to the bladder by easily dissected adhesions, but on the left side the walls of the two viscera are so infiltrated by the neoplasm as to form a continuous mass.

Upon opening the bladder its wall is found to be infiltrated; and a mass of neoplasm about 2 cm. in diameter springs from the left anterior wall, occupies the entire trigone, and projects into the interior. Through the centre of this mass there is a ragged opening which connects with the urethra below. The bladder contains about 75 c.c. of turbid urine. The tumor mass in the bladder is entirely different in appearance from the vaginal mass, being grayish-pink in color. It is devoid of the hemorrhagic character of the vaginal growth. It is soft and œdematous. The surface is smooth and the substance translucent.

The uterus is very small and is peculiarly divided by a transverse cicatricial band so that the cervix and corpus are almost separated one from the other. The corpus also has a peculiar angulation and twist in consequence of the pressure of the band. The uterus is adherent to the bladder anteriorly and to the rectum posteriorly. It is, however, easily dissected free and is in no way invaded by the tumor. The vaginal portion of the cervix is slightly eroded, but it and the uterine mucosa are free of warts or polyps.

The rectum is so compressed as to be like a ribbon in appearance. It is empty and is not invaded by the tumor.

Both ureters were dissected and traced from the bladder to the kidneys. Their dilatation and the hydronephrosis does not depend upon obstruction of their vesical orifices, but is due to the regurgitation of urine during the efforts made to expel the urine from the bladder.

The right ovary and tube are in fairly normal condition.

The left ovary and tube are caught in a mass of adhesions and were not found in the dissection.

The tumor grew by continuous extension and infiltration; there were no lymphatic metastases in the pelvis.

The terminal sufferings of the patient were made clear by the cystic mass that obstructed the urethra and caused the backward flow of the urine into the ureters and pelves of the kidneys, and by the distended vagina which compressed the rectum almost to complete obstruction.

Death was probably caused by uremic blood poisoning following the damage to the kidneys, though it could be sufficiently explained by the exhaustion of the little patient through efforts to overcome the mechanical impediments to urination and defecation. No signs of anything in the right groin to correspond to the mass that disappeared under the use of the *x*-ray could be found.

The original appearance of the tumor, with its polypoid cysts, like a "bunch of currants," its malignancy, the age of the little patient, and the clinical course seem to leave no doubt that the case belonged to the rare neoplasms to which Pfannenstiel first applied the term "*grape-like sarcomas,*" and which are now frequently known as *sarcoma botryoides vaginæ.*

Histological Examination of the Tumor. The first tissue subjected to microscopic examination was that removed at the first operation by Dr. Reed. It is, indeed, the only tissue whose study has been of much use. Undue eagerness to preserve the entire pelvic viscera for the museum caused us to neglect to secure fragments for histological study, and when it became desirable to do so it was too late, as the reagents to which they had been subjected had destroyed their cellular structure (Figs. 2, 3, and 4).

The portion studied, therefore, corresponds to that examined by Dr. Pitfield, and myself, at our consultation of July 8, 1908, and consists of an irregularly hemispherical fragment. The flattened surface being that through which the cutting instrument passed; the rounded surface that of the tumor itself. Examination of this fragment shows that although it was removed little more than two weeks after it had been examined *in situ* it had undergone some change. It appears less lobulated and no longer contained the numerous cysts. Such cysts as are present appear smaller, and after immersion in the formaldehyde quite inconspicuous.

The sections cut for examination with the microscope were made in a direction perpendicular to the surface and passed through the entire thickness of the excised fragment.

The surface was, in general, covered with the vaginal squamous epithelium. This was more or less densely infiltrated with leukocytes, by which it was more or less completely disorganized in scattered areas. The destruction of the epithelium was almost confined to the exposed surface; where it dipped down between the papillary formations it was fairly well preserved. The leukocytic invasion was most marked upon the surface but occasionally penetrated to a considerable depth into the tissue of the tumor proper.

The tumor tissue began immediately beneath the vaginal epithelium, and in many places the superficial portion of the growth was a confused aggregation of dissociated epithelium, leukocytes, cells of the tumor proper, and cells that may have belonged to the fibromuscular tissues of the vaginal wall.

The more superficial portion of the tumor tissue differed from its deeper portions in a peculiar wide separation of the cellular elements ascribable to œdema. This œdema seemed to reach its maximum at occasional foci near the surface which appear to correspond to the cysts. If such were the case, one was much deceived, for the cystic appearance was striking. However, the microscopic study of the tissues revealed the presence of no true cysts. This explanation of

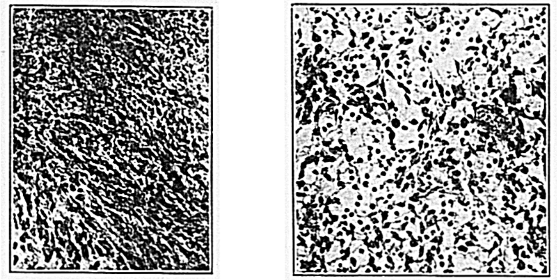

FIG. 2 FIG. 3

FIG. 2.—Photomicrograph showing the generally degenerated character of the tumor tissue, but still showing its structure to be composed of spindle-cells.

FIG. 3.—Photomicrograph of one of the œdematous areas of the tumor tissue.

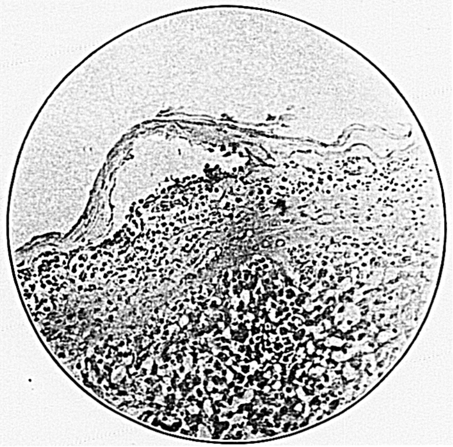

FIG. 4.—Photomicrograph showing the surface of the tumor. The vaginal epithelium, by which the tumor is covered, is found to be fairly well preserved at this point, though it is separated and elevated at the centre, because of an extensive infiltration of leukocytes. Immediately below the epithelium the tumor tissue begins in a somewhat œdematous and miscellaneous collection of cells.

œdematous tumor villi and polypi simulating cysts is quite in keeping with the subsequent changes in its structure, for it appeared highly cystic when first seen, less so when Dr. Reed operated upon it, and scarcely at all so when it was finally examined at autopsy. In thus explaining the cystic appearances I am supported by the observation of Kolisko who, in speaking of the cyst-like formations in one of the tumors examined by him, says that "they were not actual spaces, but points at which the cells were widely separated from one another by fluid." It is a pity that we did not think to puncture one or two of them at the first examination, yet it is doubtful whether even such treatment would have made us sure of their nature, as the œdematous fluid would probably have leaked out much like the fluid from a punctured cyst.

The tissue of the tumor proper is almost entirely composed of spindle cells. They are somewhat irregular in shape and differ materially in different parts of the tumor. In what may be regarded as its "healthy" parts the cells are fairly regular in shape and form definite short spindles which lie side by side in fasciculi. Here and there one finds a strand of fibrillar tissue, but usually only in proximity to small bloodvessels. Here and there in the denser parts of the cellular growth small bloodvessels with only the endothelial coat may be found.

From such "healthy" and dense portions the tissue passes by imperceptible stages into the œdematous portions first described, where the cells are widely separated one from another and form a miscellany of spindle, stellate, clavate, and irregularly rounded cells. Among these are many leukocytes and not a few plasma cells. The nuclear structure is, in general, badly preserved. The formaldehyde fixation is imperfect, but only a small part of the appearance can be referred to it, as karyokinetic figures are numerous in the better preserved tissue areas, and though epithelial cells and leukocytes stain well, the nuclei of tumor cells in juxtaposition to them stain uniformly and palely. Again, in the poorly preserved portion of the tumor tissue and in the œdematous portions, though the nuclei of the leukocytes, cells of the bloodvessels, and those of a few of the tumor cells stain well, the generality of the tumor cells show more or less karyolysis and swelling to many times the normal size. Among the monstrous cells thus formed many have nuclei of giant size, and a few have several nuclei. These small giant cells are, however, too small and too few to merit much attention or affect the nomenclature of the tumor.

Although many sections were examined with care, no muscle cells other than could be accounted for by proximity to vessels, or be looked upon as remnants of the original vaginal tissue could be found. It was quite clear that neither muscle or cartilage were true components of the tumor.

The tumor, therefore, appears to be a simple *spindle-cell sarcoma* with localized foci of œdema and degeneration.

In the excised fragment only the epithelial coat of the vagina and the tumor tissue were present. It seemed clear that the tumor had grown in the mucosa, elevated the epithelium, and dissected it from the muscle.

Table Showing the Chronological Distribution of Cases of Sarcoma of the Vagina (not including Sarcoma Botryoides).

1867.	1 case.	Ahlfeld.
1869.	1 case.	Meadows.
1869.	1 case.	Heckford. Infant.
1872.	2 cases.	Spiegelberg.
1872.	2 cases.	Kaschewarowa-Rudwena.
1875.	1 case.	Fränkel.
1875.	1 case.	Mann.
1880.	1 case.	Biardi.
1884.	1 case.	Simmons.
1885.	1 case.	Mentzel.
1885.	1 case.	Underhill.
1885.	1 case.	Young.
1886.	1 case.	Gervis.
1886.	1 case.	Handfield-Jones.
1887.	1 case.	Parona.
1887.	1 case.	Spadaro.
1888.	1 case.	Steinthal.
1889.	1 case.	Herzfeld.
1889.	1 case.	von Rosthorn.
1889.	1 case.	Marshall. Infant.
1890.	1 case.	Odebrecht.
1891.	1 case.	Alglave and Mibian.
1891.	1 case.	Ferrari.
1891.	1 case.	Gow.
1891.	1 case.	Hofmokle.
1891.	1 case.	Kalustow.
1891.	1 case.	Wirtz.
1892.	1 case.	Gatti.
1892.	2 cases.	Oliver.
1892.	1 case.	Wirt.
1893.	1 case.	Tor Neumann.
1894.	1 case.	Klein.
1894.	1 case.	Merutz.
1895.	1 case.	Senn.
1896.	2 cases.	Horn.
1896.	1 case.	Rubeska.
1897.	1 case.	Amann.
1898.	1 case.	Morestin.
1898.	1 case.	Francke.
1899.	1 case.	Gebhardt.
1899.	2 cases.	Jung.
1899.	1 case.	Smallwood-Savage.
1899.	1 case.	Waldstein. Infant.
1899.	1 case.	Strassmann. Infant.
1900.	1 case.	Moovis.
1909.	1 case.	Seitz.
1901.	1 case.	Piechand and Guyot. Infant.
1902.	1 case.	Macnaughton-Jones.
1903.	1 case.	Rashkes.
1904.	1 case.	Jellett and Earl.
1904.	1 case.	Marullez. Infant.
1905.	1 case.	Rollin.
1905.	1 case.	Peyroche. Infant.
1906.	1 case.	Boldt.
1906.	1 case.	Potherat.
1907.	1 case.	Jellett.
1907.	1 case.	Holmes. Infant.
1907.	1 case.	Amann. Infant.
1908.	1 case.	Moovis.
1908.	1 case.	Rosenberger.
1908.	1 case.	Deck. Infant.
1909.	1 case.	Favill.
1909.	1 case.	McLean.

Total { Adult 58
Infantile 10

68 cases in 42 years.

Table Showing the Chronological Distribution of Cases of the Grape-like Form of Sarcoma of the Vagina or Sarcoma Botryoides Vaginæ.

1854.	1 case.	Guersant.
1874.	1 case.	Marsh.
1880.	1 case.	Ahlfeld.
1880.	1 case.	Sänger.
1881.	1 case.	Soltmann.
1882.	1 case.	Hauser.
1883.	1 case.	Babes.
1883.	1 case.	Smith.
1888.	2 cases.	Fricke.
1888.	1 case.	Gränicher.
1888.	1 case.	Kövner.
1888.	1 case.	Schustler.
1888.	1 case.	Steinthal.
1889.	3 cases.	Kolisko.
1895.	2 cases.	Powers.
1896.	1 case.	Braun.
1896.	1 case.	Hollander.
1900.	1 case.	Lea.
1900.	1 case.	Starfinger.
1900.	1 case.	Brown.
1902.	1 case.	Rabe.
1903.	1 case.	Wrede.
1904.	1 case.	Le Dentu.
1905.	1 case.	Aubert.
1907.	1 case.	Kelly and Noble.
1907.	1 case.	Rosenbach.
1909.	1 case.	Schiller.
1910.	1 case.	Miller and Gurd.
1910.	1 case.	Knoop.
1911.	1 case.	McFarland.

Total: 34 cases in 57 years.

Table Showing the Anatomical Origin of Sarcoma Vaginæ, not Including Sarcoma Botryoides.

	Cases
Vulvovaginal entrance	2
Entire circumference of the vagina	2
Anterior wall	20
Posterior wall	19
Right wall	2
Left wall	4
Vesicovaginal septum	1
Rectovaginal septum	1
Not stated	17
	68

Table Showing the Anatomical Origin of Sarcoma Botryoides Vaginæ.

	Cases.
Vulvovaginal entrance	2
Whole vagina	2
Anterior wall	10
Posterior wall	4
Right wall	2
Left wall	4
Not stated	10
	34

Table Showing the Geographical Distribution of the Reported Cases of Sarcoma Vaginæ, not Including Sarcoma Botryoides.

	Cases.
Germany	27
France	6
Italy	5
United States	5
British Isles	20
Austro-Hungary	4
Russia	1
Switzerland	1
	69

Table Showing the Geographical Distribution of the Reported Cases of Sarcoma Botryoides Vaginæ.

	Cases.
Germany	21
Switzerland	1
United States	5
France	3
British Isles	4
	34

Table Showing the Fatality of the Different Histological Forms of Sarcoma of the Vaginæ Exclusive of Sarcoma Botryoides Vaginæ.

Histological character of the tumor.	D.	R.	Termination unknown.	Cases.
Round-cell sarcoma	0	1	8	9
Spindle-cell sarcoma (this includes Horn's case called alveolar spindle-cell sarcoma with much pigmentation)	5	3	9	17
Round- and spindle-cell sarcoma (this includes von Rosthorn's case in which Veit states that there were giant cells)	2	0	0	2
Myosarcoma (this includes all forms in which muscle cells were found)	0	0	2	2
Fibrosarcoma (this includes Ahlfeld's case called sarcoma fibrosum multo-et-fuso-cellulare telangiectoides diffusum)	1	2	0	3
Myxosarcoma	0	2	0	2
Melanosarcoma	1	0	1	2
Giant-cell sarcoma	0	0	1	1
Angiosarcoma (this includes Kalustow's case called sarcoma telangiectoides seu angiomatosum hemorrhagicum)	2	0	1	3
Endothelioma (this includes Klein's case called lymph-angio-endothelioma cavernosum hemorrhagicum)	0	0	3	3
Unknown	5	0	9	14
	16	8	34	58

Table Showing the Fatality of the Different Histological Forms of Sarcoma Botryoides Vaginæ.

Histological character of the tumor	D.	R.	Termination unknown.	Cases.
Round-cell sarcoma	1	0	0	1
Spindle-cell sarcoma	3	0	1	4
Round- and spindle-cell sarcoma	5	1*	0	6
Myosarcoma (includes all cases in which muscle cells were found)	3	0	0	3
Myo-fibro-sarcoma	1	0	0	1
Fibrosarcoma	2	0	1	3
Myxosarcoma	1	0	0	1
Unknown	10	1†	4	15
	26	2	6	34

* No return in 3 years.

† Was under observation only two months.

Table Showing Age Incidence, Histological Character, and Termination of Reported Cases of Grape-like Sarcoma of Infancy or Sarcoma Botryoides Vaginæ.

Age of patient.	Cases.	Nature of the tumor.	Termination.
Not given	1	?	?
Congenital	1	?	Died.
3 months	1	Spindle-cell sarcoma	Died.
6 months	1	Spindle-cell sarcoma	Died (of bronchopneumonia).
6 months	1	Round- and spindle-cell sarcoma	Died.
7 months	1	Round- and spindle-cell sarcoma	Died.
8 months	1	?	Died.
9 months	1	?	No return in two months.
12 months	1	Myosarcoma	Died.
18 months	1	?	Died.
18 months	1	Myofibrosarcoma	Died.
18 months	1	Round- and spindle-cell sarcoma	Died.
18 months	1	Spindle-cell sarcoma	Died.
21 months	1	?	Died.
24 months	1	?	Died.
24 months	1	?	?
24 months	1	Myxosarcoma	Died.
28 months	1	Fibrosarcoma	Died.
28 months	1	Myosarcoma	Died.
30 months	1	Round- and spindle-cell sarcoma	Recovered(no return in 3 years).
30 months	1	?	Died.
30 months	1	?	Died.
30 months	1	Fibrosarcoma	?
30 months	1	?	Died.
32 months	1	?	?
36 months	1	Spindle-cell sarcoma	?
36 months	1	?	Died.
36 months	1	Small round-cell sarcoma	Died.
40 months	1	Fibrosarcoma	Died.
42 months	1	Myosarcoma	Died.
44 months	1	?	Died.
48 months	1	?	?
53 months	1	Round- and spindle-cell sarcoma	Died.
60 months	1	Round- and spindle-cell sarcoma	Died.
	34		

Table Showing Age Incidence, Variety, and Termination of Cases of Miscellaneous Sarcoma of the Vagina, not Including Sarcoma Botryoides.

Age of patient.	Cases.	Nature of tumor.	Termination.
8 months	1	Myxosarcoma	Died (of scarlatina while in the hospital).
10 months	1	?	Died.
11 months	1	Rhabdomyosarcoma	Died.
16 months	1	Perithelioma	Recovered.
17 months	1	Round-cell sarcoma	Died.
18 months	1	?	Died from peritonitis from accident to operation wound.
18 months	1	?	?
18 months	1	Endothelioma	Died.
24 months	1	Myosarcoma	Died.
31 months	1	?	Died.
14 years	1	Endothelioma	?
15 years	1	Sarcoma fibrosum multo-et fuso-cellulure telangiectodes hemorhagium. (In our tables this is classed as fibrosarcoma.)	Died.
15 months	1	Spindle-cell sarcoma	Died.
15 years	1	Rhabdomyosarcoma	?
16 years	1	Round-cell sarcoma	Recovered.

Table Showing Age Incidence, Variety, and Termination of Cases of Miscellaneous Sarcoma of the Vagina, not Including Sarcoma Botyroides (Continued).

Age of patient.	Cases.	Nature of tumor.	Termination.
17 years	1	Spindle-cell sarcoma	Died.
17 years	1	Spindle-cell sarcoma	Died.
17 years	1	Spindle-cell sarcoma	?
19 years	1	?	Died.
23 years	1	Sarcoma telangiectoides seu angioma hemorrhagicum. (In our tables this is classed as angiosarcoma.)	Died.
25 years	1	Round-cell sarcoma	Died.
25 years	1	Round-cell sarcoma	?
28 years	1	?	?
28 years	1	Spindle-cell sarcoma	Discharged
30 years	1	Round-cell sarcoma	?
30 years	1	Myxosarcoma (myxoma?)	Recovered.
31 years	1	Melanotic spindle-cell sarcoma	Died.
32 years	1	Angiosarcoma	Died.
32 years	1	?	?
33 years	1	Small round-cell sarcoma	?
34 years	1	Spindle-cell sarcoma	?
34 years	1	?	Discharged in 6 weeks
34 years	1	Small round- and spindle-cell sarcoma	?
35 years	1	Fibrosarcoma	Recovered.
35 years	1	?	Died.
35 years	1	Spindle-cell sarcoma	Recovered.
37 years	1	Melanotic sarcoma	?
38 years	1	Spindle-cell sarcoma	?
39 years	1	Endothelioma	?
39 years	1	?	?
41 years	1	Spindle-cell sarcoma	Recovered
43 years	1	Round- and spindle-cell sarcoma with giant cells. (In our tables this is classed as a round- and spindle-cell sarcoma.)	?
44 years	1	Spindle-cell sarcoma	?
49 years	1	Spindle- and stellate-cell sarcoma with muscle cells. (In our tables this is classed as a myosarcoma.)	?
49 years	1	Alveolar spindle-cell sarcoma	Died.
50 years	1	Round- and spindle-cell sarcoma	Died.
51 years	1	?	Died.
54 years	1	Sarcoma, hypernephroma or lymphangioma hypertrophicum (In our tables we class this as histologically unknown.)	?
55 years	1	Angiosarcoma or endothelioma	Recurred
55 years	1	?	?
55 years	1	Spindle-cell sarcoma	Recovered
56 years	1	Lymphangio-endothelioma cavernosum hemorrhagicum. (In our tables we class this as endothelioma.)	?
58 years	1	?	Died.
58 years	1	Small round-cell sarcoma	?
60 years	1	Round- and oat-shaped-cell sarcoma	Died.
70 years	1	?	?
82 years	1	Spindle-cell sarcoma	Recovered.
Unknown	11		
	68		

Age Incidence of Sarcoma of the Vagina.

	Miscellaneous.	Botryoides.
First decade	10	34
Second decade	9	0
Third decade	5	0
Fourth decade	16	0
Fifth decade	5	0
Sixth decade	9	0
Seventh decade	1	0
Eighth decade	1	0
Ninth decade	1	0
	—	—
	57	34
"Young woman"	1	
"Old maid"	1	
Age not given	9	
	—	
	68 miscellaneous	
	34 botryoides	
	—	
	102 cases	

Reported Cases of Sarcoma of the Vagina.

I. Infantile. *Grape-like Sarcoma or Sarcoma Botryoides.*

1. Ahlfeld, I. F. Archiv. f. Gynäkologie, 1880, xvi, 135.

2. Aubert, L. H. Revue médicale de la Suisse Romande, 1905, xxv, 584.

3. Babes, V. von Ziemssen's Handbuch der spezielle Path. u. Therapie, 1883 and 1884, xiv, 475.

Billroth. Chirurg. Klinik, 1871. This case is reported by Kolisko (see below), and is accredited to him.

4. Braun. Inaugural Dissertation. Greifswald, 1896.

5. Brown, B. B. Baltimore Gynecological Society, 1900.

Demme. Med. Bericht ueber die Thätigkeit der Jennerschen Kinderspitals in Bern, 1892, p. 95. This is an amplification of the facts about the case published by Gränicher (see below).

6. Le Dentu. La Presse Médicale, 1904, xi, 321.

7, 8. Frick, C. Inaugural Dissertation. Halle a/s, 1888; Virchow's Archives, 1889, cxvii, 284. Reports two cases: (1) From the clinic of Professor Roosenberg in Haag; (2) from the clinic of Professor von Volkmann in Halle a/s.

9. Gränicher. Inaugural Dissertation. München, 1888. This case occurred in the clinic of Professor Demme.

10. Guersant, M. P. Moniteur des Hôpitaux, 1854, p. 18.

11. Hauser, G. Virchow's Archives, 1882, lxxxviii, 165.

12. Holländer. Zeitschrift für Geburtshülfe und Gynäkologie, 1896, xxxiv, 125.

13. Kelly and Noble. Gynecology and Abdominal Surgery, 1907, i, 820.

14, 15, 16. Kolisko. Wiener klinische Wochenschrift 1889, 109 *et seq.* Reports 3 cases: (1) Child named Tredham from Professor Weinlechner's clinic; (2) child named Floh from Professor Weinlechner's clinic; (3) child named Heindle from Professor Billroth's clinic.

17. Körner. Inaugural Dissertation. Halle a/s, 1888.

18. Knoop. Zeitschrift für Geburtshülfe und Gynäkologie, 1910, lxvi, No. 3, 569.

19. Lea, A. W. W. Obstetrical Transactions, London, 1900, xlii, 143.

20. Marsh. Transactions of the Pathological Society of London, 1874, xxv, 178.

21. McFarland, Joseph. Present Contribution.

22. Miller and Gurd. Surgery, Gynecology, and Obstetrics, October, 1910, xi, No. 4, 391.

23. Powers, D'Arcy. St. Bartholomew's Hospital Reports, 1895, xxxi, 121; also Trans. of the Pathological Society of London, October 15, 1895; also British Medical Journal, 1895, ii, 973.

24. Powers, D'Arcy. An old specimen No. 3030 from the Museum of St. Bartholomew's Hospital. See the Hospital Reports, 1895, xxxi, 121.

25. Rabé. Archiv. de méd. des enfants, 1902, v, 584; also Revue de Gynecologie et de Chirurgie Abdominale, 1903, vii, 941.

Rollin. Revue de Gynecologie et de Chirurgie Abdominale, 1906, x, 3. This is the case previously reported by Le Dentu (see above).

26. Rosenbach, L. Charité Annalen, 1907, xxxii, 393.

27. Sänger, M. Archiv. f. Gynäkologie, 1880, xvi, 58.

28. Schiller. Monatschrift f. Geburtshülfe u. Gynäkologie, April, 1909.

Schuchardt. Verhandlung der deutschen Gesellschaft für Gynäkologie, 1888, 239. He reports the same two cases that form the basis of the Inaugural Dissertation by Fricke. (1) From the clinic of Professor Roosenberg in Haag; (2) from the clinic of Professor von Volkmann in Halle a/s.

29. Schustler, M. Wiener klinische Wochenschrift, 1888, i, 148; also Verhandlung ärztlicher Gesellschaften und Vereine, May 14, 1888.

30. Smith. American Journal of Obstetrics, 1883, xvi, 555, with a supplementary note. in the same journal, 1893, xxvii, 577.

31. Soltman, O. Jahrbuch für Kinderheilkunde, 1881, xvi, 418.

32. Starfinger, E. Inaugural Dissertation, Berlin, 1900.

33. Steinthal, C. F. Virchow's Archives, 1888, cxi, 449.

Thomas. A case given by Powers (see above) seems to be vulvar and not vaginal. According to Peyrache this tumor was a myxoma and when removed did not return.

Von Volkmann. Cases credited by Powers to von Volkmann are the cases reported) by Fricke and Schuchardt.

34. Wrede, L. Orth Festschrift, 1903, p. 673.

Weinlechner. Powers gives Weinlechner credit for two cases, referring to them (1) Wiener klin. Wochenschrift, 1889, 109, 130; and Medical Press and Circular, 1888, i, 616. The first reference is to the paper by Kolisko, the cases being those he describes and publishes, the second is a mere mention of Weinlechner's having had a case and no doubt refers to the same two reported by Kolisko.

II. INFANTILE. *General or Miscellaneous.*

1. Amann, J. A. Archiv. f. Gynäkologie, 1907, lxxxii, 746.

2. Deck. Inaugural Dissertation, Zürich, 1908; also Münchener med. Wochenschrift, 1908, p. 137.

3. Heckford. Trans. Obstetrical Society of London, 1869, x, 224.

4. Holmes. Pediatrics, 1907, xix, 95; also Trans. Medical Association of Georgia, 1906, p. 304.

5. Marshall. L. W. British Medical Journal, 1889, ., 127.

6. Marullaz, M. Thesé, Lausanne, 1904.

7. Peyrache, J. Thesé, Paris, 1905.

8. Piechaud and Guyot. Revue mensuelle de Gynecologie, Obstetrique et Pediatric de Bordeaux, 1901, iii, 210; also Congres de Nantes, 1901; also Revue de Gynecologie et de Chirurgie Abdominale, 1901, iii, 210.

9. Strassmann. Berichte aus Gynäk. Gesellschaften u. Krankenhäusern, Gesellschaft für Geburtshülfe und Gynäkologie zu Berlin, April 28, 1899; Centralbl. f. Gynäkologie, 1899, xxiii, 654; Zeitschrift f. Geburtshülfe u. Gynäkologie, 1899, xli, 519, 986.

10. Waldstein, E. Archiv. f. Gynäkologie, 1899, lviii, 427; Centralbl. f. Gynäkologie, 1899, xxiii, 1552.

III. ADULTS.

1. Ahlfeld. Archives f. Heilkunde, 1867, viii, 560.

2. Alglave and Milian. Bull. Soc. Anat. de Paris, 1891, lxxiii, 651.

3. Amann, J. A. Kurzgefasstes Lehrbuch der Mikroskopische Gynäkologischen Diagnostik., Wiesbaden, 1897, p. 38.

4. Baiardi, D. Annali di Obstetricia, Ginecologia, e Pediatria, 1880, ii, 47.

5. Boldt, H. J. American Journal of Obstetrics, 1906, liv, 550; New York Obstetrical Society, May 8, 1906.

6. Favell. British Medical Journal, 1909, ii, 1677; also North of England Obstetrical and Gynecological Journal, Friday, November 19, 1909.

7. Ferrari. Sala Chir. d. osp. Magg. di Bergamo, 1891, p. 179.

8. Fraenkel. Deutsche Zeitschrift für prakt. Med., 1875, p. 77.

9. Francke, R. Inaugural Dissertation, Berlin, 1898, p. 93; Centralbl. f. Gynäkologie, 1899, xxiii, 825; Virchow's Archives, cliv, p. 363.

10. Gatti. Gior. della R. Acad. de Med. di Torino, 1892.

11. Gebhard. Path. Anat. der Sexuatorgane, Leipzig, 1899, p. 555.

12. Gervis. In discussing the paper by Lewers (q. v.) mentions having seen a case in his own experience.

13. Gow. St. Bartholomew's Hospital Reports, 1891, xxvii, 97.

14. Herzfeld, C. A. Allg. Wiener med. Zeitung., 1889, xxxiv, 558.

15. Hofmokl. Wiener med. Presse, 1891, p. 1229.

16, 17. Horn, F. Monatsschrift f. Geburtshülfe u. Gynäkologie, 1896, iv, 409.

18. Jellett, H. Journal of Obstetrics and Gynecology of the British Empire, 1907, xii, 285.

19. Jellett and Earl. Trans. of the Royal Academy of Medicine in Ireland, 1904, vol. xxii.

20. Jones, Hanfield. In discussing the case reported by Lewers (q. v.), said that he had seen a case in St. Mary's Hospital.

21. Jones, H. Macnaughton. Lancet (London), 1902, i, 439.

22, 23. Jung. Centralbl. f. Gynäkologie, 1899, xxiii, 333; Monatschrift f. Geburtshülfe u. Gynäkologie, 1899, ix, Heft 3.

24. Kalustow. Archiv. f. Gynäkologie, 1891, xl, 499.

25, 26. Kaschewarowa-Rudnewa. Virchow's Archives, 1872, liv, 65.

27. Klein, R. Archiv. f. Gynäkologie, 1894, xlvi, 292.

Langdon. See case reported by Gow.

? Lewers, A. H. N. Trans. of the Obstetrical Society of London, 1886, xxviii, 78. (This tumor may have been secondary to a coexistent sarcoma of the uterus, and so has not been used in compiling the tables in this paper.)

28. Maclean, E. J. Jour. of Obstetrics and Gynecology of the British Empire, 1909, xv, 245.

29. Mann. American Journal of Obstetrics, 1875, viii, 541.

30. Meadows. Trans. of the Obstetrical Society of London, 1869, x, 141.

31. Mentzel. Centralbl. f. Gynäkologie, 1885, ix, 245.

32. Morris. Obstetrical Transactions, London, 1900, xlii, 144; mentions having seen a case in his discussion of Lea's paper.

33. Morris, C. A. Practitioner, 1908, ii, 393.

34. Müntz. Frauenarz*, 1894, ix, 297.

35. Morestin, H. Bulletins de la Société Anatomique de Paris, 1898, xii, 431.

36. Odebrecht. Berliner klin. Wochenschrift, September 1, 1890; Gesellschaft für Geburtshülfe und Gynäkologie zu Berlin, January 24, 1890.

37, 38. Oliver. Medical Press and Circular, 1892, liii, 475.

39. Parona. Annali Univ. med. Chir., Milano, 1887, 241.

40. Potherat. Bulletins et mémoir de la Société de Chirurgie de Paris, 1906, xxxii, 703.

41. Rashkes. Medycyna. Warszawa, 1903, vol. xxxi; J. Akush. i jensk. boliez, St. Petersburg, 1903, xvii, 1359 (abstract Centralbl. f. allg. Path. u. f. path. Anat., 1903, xiv, 657).

42. Rollin. Revue de Gynécologie, 1905, ix, 1055, 1087.

43. Rosenberger. Szüleszet és nögyogy, Budapest, 1908, p. 33.

44. Von Rosthorn, A. Wiener klin. Wochenschrift, 1889, ii, 729. This case is also referred to by Breisky, Krankheiten der Vagina, Deutsche Chirurg. Leif., 1886, p. 60

45. Rubeska, W. Centralbl. f. Gynäkologie, 1896, 113, N. 5.

46. Savage, Smallwood. British Medical Journal, 1899, ii, 1281.

47. Senn, N. American Journal of Obstetrics, 1895, xxxi, 565.

48. Seitz. Sammlung klinische Vorträge, Leipzig, 1900-3, No. 208, p. 76

49. Spodaro. Gaz. d. osp., Milano, 1887, viii, 275.

50. Simmons. Edinburgh Obstetrical Transactions, 1884 and 1885, x, 205.

51, 52. Spiegelberg. Archiv. f. Gynäkologie, 1872, iv, 348.

53. Steinthal, C. F. Virchow's Archives, 1888, cxi, 449.

54. Ter Neumann. Warfvinge Festschrift, Gothenburg, 1893, and 1895.

55. Underhill. Edinburgh Medical Journal, 1885, p. 485.

56. Wirt. Inaugural Dissertation, Bonn, 1891 (abstract Centralbl. f. Gynäkologie, 1892, xiv, 442.

57. Wirz. Inaugural Dissertation, Bonn, 1891.

58. Young, P. Edinburgh Medical Journal, 1885, p. 485.